

• • R E M A R K S / A R G U M E N T S • •

The Official Action of May 21, 2004 has been thoroughly studied. Accordingly, the changes presented herein for the application, considered together with the following remarks, are believed to be sufficient to place the application into condition for allowance.

As requested by the Examiner on page 2 of the Official Action, applicant is submitting herewith a Substitute Specification under 37 CFR §1.125 (a) together with a hand-marked-up copy of the original specification showing the changes made to the original specification.

The undersigned affirms that the Substitute Specification only contains the changes noted in the hand-marked-up copy of the original specification and does not contain any new matter.

Entry of the Substitute Specification is respectfully requested.

Also by the present Amendment the Abstract has been changed.

In addition, the claims have been changed in the manner courteously suggested by the Examiner.

Entry of the Substitute Specification, amendments to the Abstract and amendments to the claims are respectfully requested.

Claims 1-3 are pending in this application.

Claims 1 and 2 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over co-pending application serial no. 10/627,267.

Claim 3 stands provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over co-pending application serial no. 10/627,267 in view of JP 2-180941.

In response to the provisional obviousness-type double patenting rejections, the undersigned notes that applicant will be filing a Terminal Disclaimer to overcome this rejection in due course and the Examiner is requested to hold this provisional rejection in abeyance until an executed Terminal Disclaimer can be obtained and submitted. (This case was recently transferred to the undersigned, who does not have a power of attorney to sign a Terminal Disclaimer for the applicant)

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

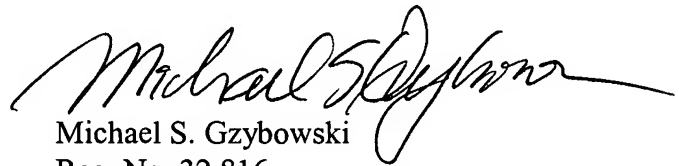
The prior art cited but not relied upon by the Examiner has been noted. This prior art is not believed to be particularly pertinent to applicants' claimed invention.

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved; the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

Appl. No. 10/627,267
Amdt. Dated September 21, 2004
Reply to Office Action of May 21, 2004

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Michael S. Gzybowski", with a long horizontal flourish extending to the right.

Michael S. Gzybowski
Reg. No. 32,816

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11775.1



SPECIFICATION

RESIN COMPOSITION FOR PURGING CONTAMINANT IN THE PLASTIC PROCESSING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a resin composition for purging ~~contaminant~~^{contaminants} in ~~the~~^a plastic processing machine.

2. Description of the Related Art

Plastics have excellent properties such as easy processability, high ~~pro-~~^{productivity} ductivity, light weight and relative low procuring ~~cost~~^{costs}, so they are used for the parts and structural materials for ~~auto-~~^{automobiles} mobile, automobile^s, scooter^s, television^s, radio^s, audio equipment^s, washing machine^s, rice^s cooker^s, personal computer^s, portable telephone^s, game machinery^s, building ~~mate-~~^{materials} rials, office supplies, stationery^s, toys, sports goods, sports equipment, ~~agricul-~~^{agricultural} tural tools and marine tools.

They ~~are~~^{these products} usually prepared by plastic processing methods such as injection ~~mo-~~lding, blow molding, compression molding, transfer molding, rotating molding, slush molding, inflation tubular film process, and extrusion molding.

As plastics processing are conducted at high ~~temperature~~^{temperatures} above 200°C, additives, monomers, decomposed materials in the plastics are changed to carbonized ~~mate-~~^{materials} rials such as tar, pitch and other ~~colo-~~^{color} rors colored.

ured sticky substances, which are apt to adhere to the surface of the screw, barrel and die of the plastic processing machine to cause transfer of the carbonized materials to the molded product.

^{The above} Above mentioned transfer ^{makes} the ^{surfaces} surface of molded ^{products} product dirty and ^{makes} make the dimensions of the molded product ^{inaccurate} inaccurate, resulting ^{in failure} not to perform expected moving or structural ^{functions} function, therefore cleaning the screw, barrel and die of the plastic processing machine has been required.

In case of production ^{change} change from ^{specific} specific ^{colored} coloured molded ^{articles} article to ^{non-colored} non-colored or other ^{colored} coloured molded article, ^{articleless} articleless, cleaning the screw, barrel and die has been also required to avoid ^{crosscontamination} crosscontamination caused by ^{colored} remained specifically coloured resin compound. ^{compound residue} compound residue ^{with} with

However, there are some problems ^{cleaning} on the conventional cleaning method of the screw, barrel and die.

One conventional cleaning method ^{has} been known as the ^{involves} method of dismantling the plastic processing machine, ^{resulting in} resulting in ^{exposing} exposing the screw, barrel and die to ^{the} outside, ^{then} then the carbonized material or ^{colored} coloured materials adhered to the surface of the screw, barrel and die ^{is} are removed ^{by} using the ^a separating tools ^{as} as such as knife.

However, this method has a defect of ^{temperatures} exposing ^{operators} operator to high temperature and taking ^{for} long times, which ^{often} causes ^{some} some ^{of them} of them ^{some} some operators' suffering of skin burn ^{burns} burns operators to suffer

or electric shock.

In ^{the} case of ^{machines} ~~a~~ large ^{sized} ~~size~~ plastic ^{processing} ~~proce~~ ssing machine, dismantling is impossible.

There ^{are} ~~is~~ known other conventional ~~cle~~ ^{cleaning} ~~aning~~ ^{methods} ~~method~~ in which ^{uncolored} ~~unco~~loured thermo-thermoplastic plastic resin such as low density poly-polyethylene ethylene is passed through ^{the} ~~inside~~ of ~~the~~ plastic processing machine. ^{machines} ~~machine~~

However ^{such} ~~this~~ ^{methods} ~~method~~ cannot remove contaminants entirely even if a lot of it used ^{over extended times} ~~time has been spent~~ and ^{moreover, such methods generate} ~~this method gen~~ erates a large amount of mixed product consisting of contaminants and resin, which ^{scarcely} ~~scarcely~~ find use as ^a ~~the~~ ^{recycled} ~~recycling~~ resin compound.

^{Another} ~~The other~~ cleaning method ^{involves the use of a} ~~is the meth~~ od of using the resin composition ^{containing} ~~conta~~ ining ^{an} ~~of~~ inorganic powder such as calcium carbonate which exerts improved ^{effects} ~~effe~~ ct ^{on the removal of colored} ~~of removing coloured~~ contaminants.

However, ^{this method} ~~it~~ causes new ^{problems} ~~problem~~ of ^{the} ~~rem~~ aining the inorganic power in the ^{remaining} ~~plastic~~ plastic processing machine.

Another cleaning method ~~also~~ has been attempted ^{to use a} ~~by using~~ resin composition consisting ^{of} ~~a~~ thermoplastic resin such as low density polyethylene and a surface active agent such as sodium stearate or polyoxyethylene nonylphenyl ether ^{tension. However,} ~~having~~ the effect of lowering interface ^{were} ~~tention~~, but the ^{colored} ~~coloured~~ contaminants was scarcely removed.

Based on the above mentioned knowledge, new cleaning method ^{have} ~~has~~ been disclosed in ~~the~~ Japanese Kokai Patents (H2-180941 and H7-53774), in which ~~it is disclosed~~

a resin composition consisting of ~~uncolored~~ ^{uncolored} ~~thermoplastic~~ ^{thermoplastic} resin and ^a calcium salt of ^{an} organic boron compound having ~~an~~ ^{thus} SP3 hybridization orbitals. ~~resin composition~~ ^{resin composition} ~~which maintains a certain extent~~ ^{properties} of abrasive ~~property~~ ^{amount}.

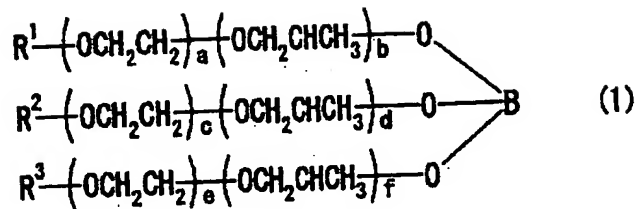
However, the method ~~is still~~ ^{does} not ~~excess~~ ^{does} exert ~~its~~ ^a sufficient effect of removing the ~~coloured contaminant~~ ^{colored contaminants}.

SUMMARY OF THE INVENTION

As a result of diligent investigation ^{during the course of} ~~by~~ the present invention, ~~under such situation~~ ^{the present invention provides a} resin composition for purging away ~~contaminant~~ ^{contaminates} ~~in the plastic processing machine~~ ^{machines} which ~~resin composition comprises~~ ^{which resin composition comprises} a thermoplastic resin and a specific borate ester of ~~polyoxyalkylene~~ ^{polyoxyalkylene} ~~and a purging method of contaminant~~ ^{purging contaminants} ~~in the plastic processing machine~~ ^{machines which involves} ~~by passing said resin composition through~~ ^{through the} ~~the inside of the plastic processing machine~~ ^{inside of the plastic processing machine}.

DETAILED DESCRIPTION OF THE INVENTION

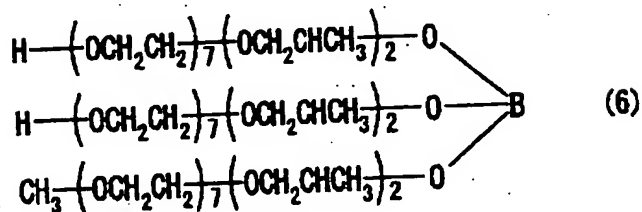
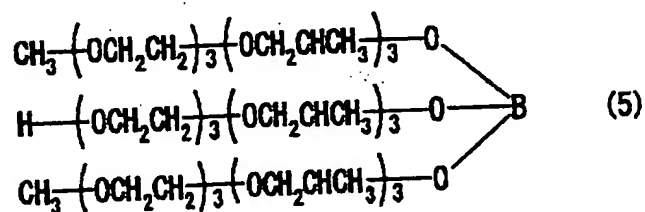
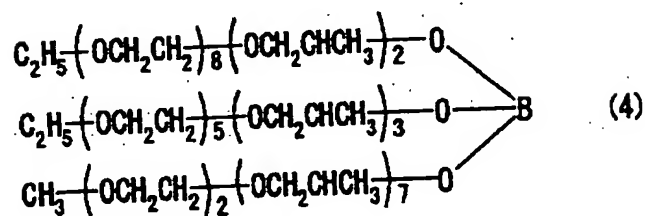
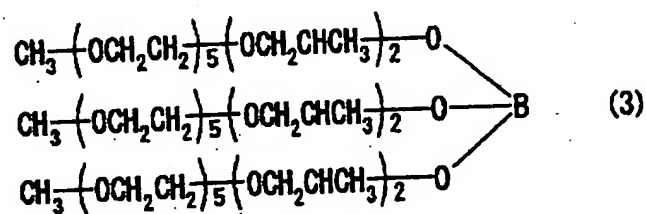
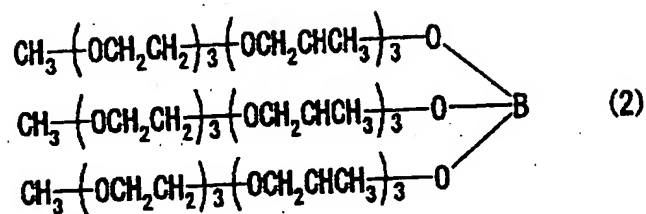
^{The} A borate ester of polyoxyalkylene ^{chemical} used for the present invention is a ~~chemical~~ ^{chemical} compound expressed by the following ~~following~~ ^{following} general formula (1).

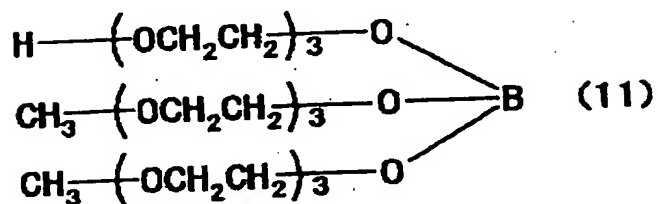
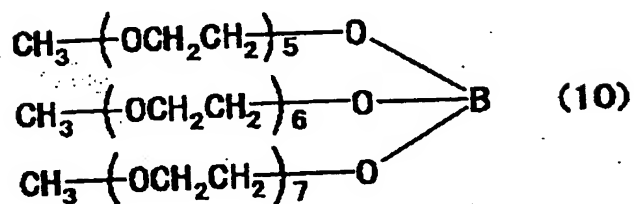
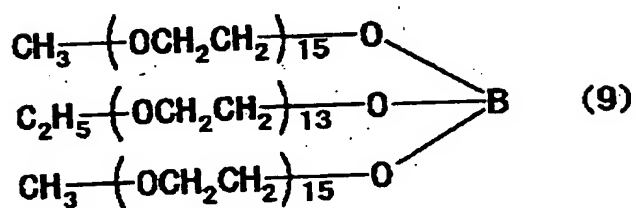
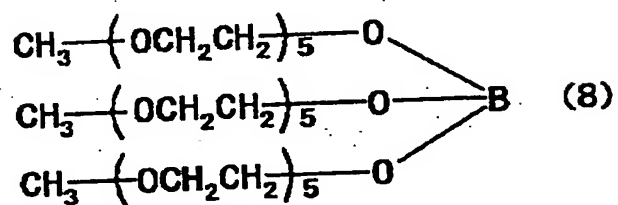
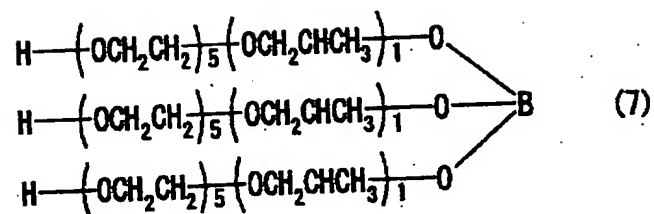


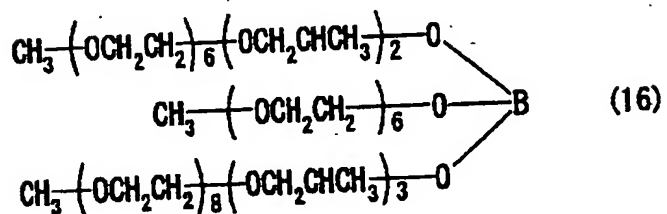
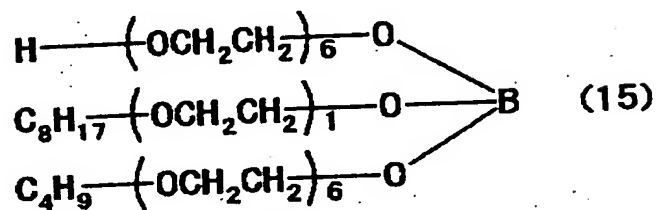
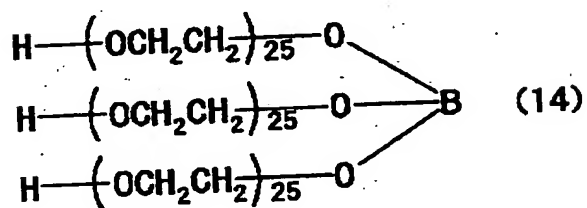
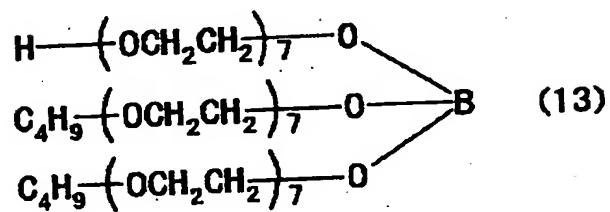
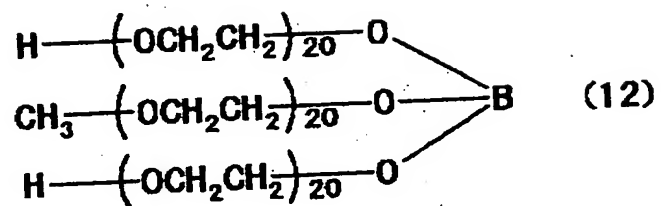
wherein R^1 , R^2 and R^3 are independently selected from ^{the} group consisting of ~~hydro-~~ ^{hydrogen} ~~gen and hydrocarbon group~~ ^{hydrocarbons}, a , b , c , d , e and f are positive integers independently ^{selected} from 0 to 30 whose sum is from 6 to 80.

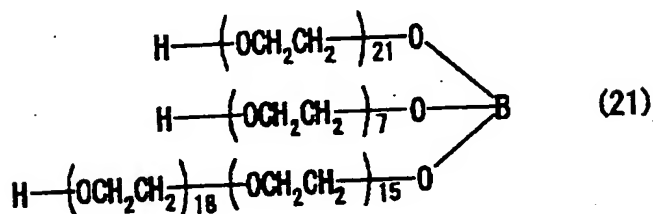
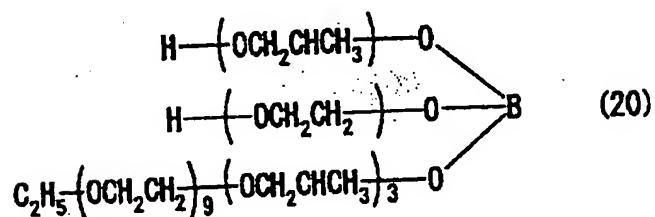
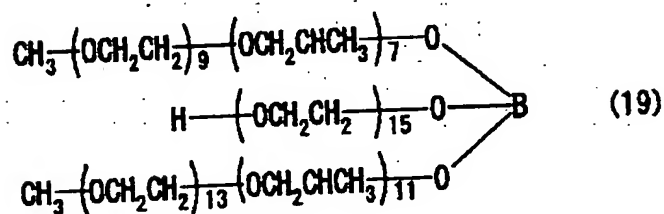
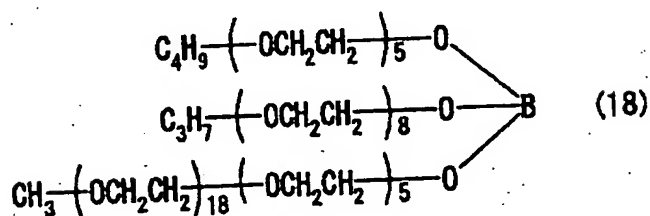
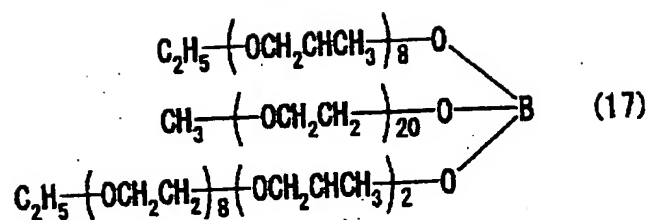
^{Examples} of the ~~hydrocarbon~~ ^{hydrocarbons} group are alkyl groups such as methyl, ethyl, ~~prop-~~ ^{propyl}, ~~yl~~, isopropyl, ^{butyl}, ^{pentyl}, hexyl, ~~octyl~~ ^{octyl}, nonyl, decyl, dodecyl, hexadecyl, octadecyl and docosyl groups and phenyl, tolyl and cyclohexyl ~~group~~ ^{groups}.

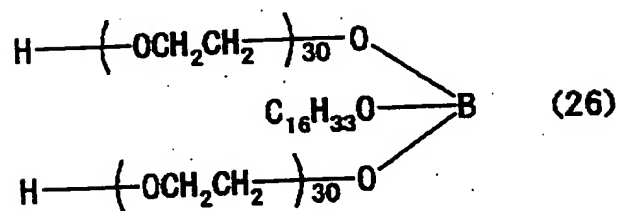
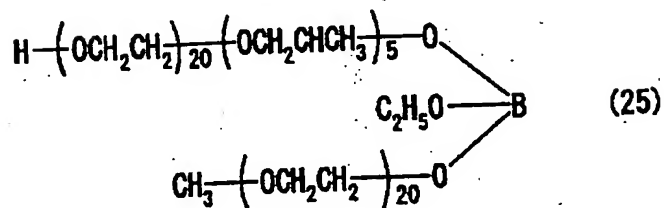
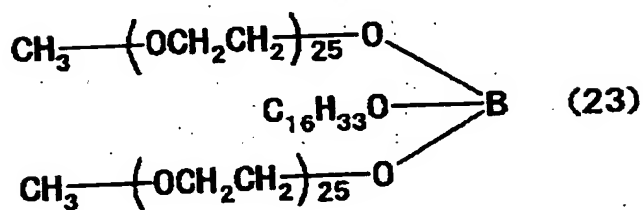
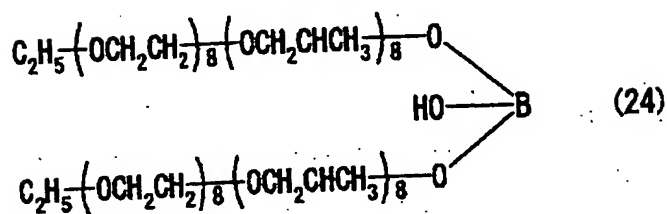
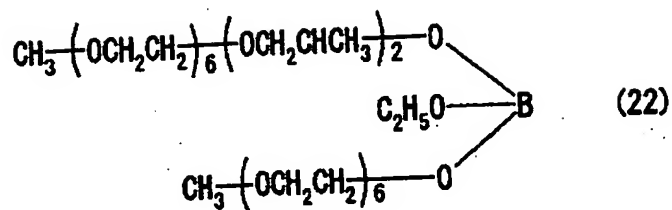
Illustrative of the borate ~~ester~~ ^{ester} of polyoxyalkylene are the chemical compound expressed by the following chemical formula from (2) to (27).

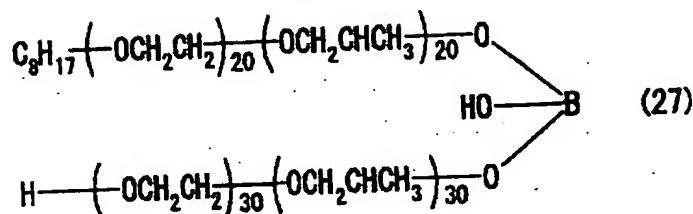












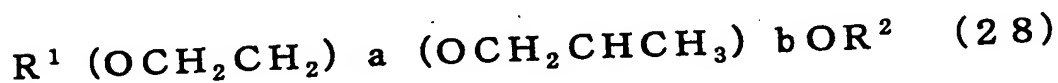
Production ~~method~~ ^{the} for borate esters of polyoxyalkylene used for ~~the~~ ^{any} present ~~in~~ ^{invention} ~~vention~~ are not limited to ~~specific met-~~ ^{preferred.} ~~method, however, but the following method is preferable.~~

The borate esters of polyoxyalkylene are produced by ~~esterification-dehydration~~ ^{esterification-dehydration} ~~ion or ester-exchange reaction by contacting~~ ^{contacting} polyoxyalkylene expressed by the chemical formula (28) with boric acid or borate esters of lower ~~alcohol~~ ^{alcohols} such as methyl alcohol or ethyl alcohol.

It is ~~preferable~~ ^{preferred} that ~~the~~ ^{the} reaction is ~~carried~~ ^{carried} out ~~by~~ using 1 mol of boric acid or borate esters of lower ~~alcohol~~ ^{alcohols} with from 3 to 3.5 moles of polyoxyalkylene ~~expressed~~ ^{expressed} by the chemical ~~formula~~ ^{formula} (28).

If the mole ratio is less than 3, ~~it is not preferable because~~ undesirable byproducts of borate esters having two or three boron atoms are generated.

The other byproducts or unreacted ~~polyoxyalkylene~~ ^{polyoxyalkylene} may be remained in the borate esters unless they ~~do not~~ ^{do not} hinder the purging effect of the resin ~~composition~~ ^{compositions} of the present invention.



wherein R^1 and R^2 are independently ~~selected~~^{selected} from ~~the~~^{hydrocarbons} group consisting of hydrogen and hydrocarbon group, ~~a and b are independently~~^{independently} selected from 0 to 30. ~~hydrocarbons~~

~~Examples~~^{Examples} of the ~~hydrocarbon group~~^{hydrocarbons} are alkyl groups such as methyl, ethyl, ~~propyl~~^{propyl}, isopropyl, ~~butyl~~^{butyl}, pentyl, hexyl, octyl, nonyl, decyl, dodecyl, hexadecyl, octadecyl and docosyl groups and phenyl, tolyl and cyclohexyl groups.

~~Examples~~^{Examples} of the polyoxyalkylene ~~expressed~~^{expressed} by the chemical formula (28) are as follows:

diethylene glycol monomethyl ether,
diethylene glycol monoethyl ether,
diethylene glycol monoisopropyl ether,
diethylene glycol monobutyl ether,
diethylene glycol monooctyl ether,
diethylene glycol monodecyl ether,
diethylene glycol monohexadecyl ether,
diethylene glycol monooctadecyl ether,

triethylene glycol monomethyl ether,
triethylene glycol monoethyl ether,
triethylene glycol monoisopropyl ether,
triethylene glycol monobutyl ether,
triethylene glycol monobutyl ether,
triethylene glycol monooctyl ether,
triethylene glycol monodecyl ether,
triethylene glycol monohexadecyl ether,
triethylene glycol monooctadecyl ether,

tetraethylene glycol monomethyl ether,
tetraethylene glycol monoethyl ether,
tetraethylene glycol monoisopropyl ether,
tetraethylene glycol monobutyl ether,

tetraethylene glycol monoethyl ether,
tetraethylene glycol monodecyl ether,
tetraethylene glycol monohexadecyl ether,
tetraethylene glycol monoctadecyl ether,

polyethylene glycol monomethyl ether,
polyethylene glycol monoethyl ether,
polyethylene glycol monoisopropyl ether,
polyethylene glycol monobutyl ether,
polyethylene glycol monoethyl ether,
polyethylene glycol monodecyl ether,
polyethylene glycol monohexadecyl ether,
polyethylene glycol monoctadecyl ether,

dipropylene glycol monomethyl ether,
dipropylene glycol monoethyl ether,
dipropylene glycol monoisopropyl ether,
dipropylene glycol monobutyl ether,
dipropylene glycol monoethyl ether,
dipropylene glycol monodecyl ether,
dipropylene glycol monohexadecyl ether,
dipropylene glycol monoctadecyl ether,

tripropylene glycol monomethyl ether,
tripropylene glycol monoethyl ether,
tripropylene glycol monoisopropyl ether,
tripropylene glycol monobutyl ether,
tripropylene glycol monoethyl ether,
tripropylene glycol monodecyl ether,
tripropylene glycol monohexadecyl ether,
tripropylene glycol monoctadecyl ether,

tetrapropylene glycol monomethyl ether,
tetrapropylene glycol monoethyl ether,
tetrapropylene glycol monoisopropyl
ether,

tetrapropylene glycol monobuthyl ether,
tetrapropylene glycol monoocthyl ether,
tetrapropylene glycol monodecyl ether,
tetrapropylene glycol monohexadecyl
ether,
tetrapropylene glycol monooctadecyl
ether,

polypropylene glycol monomethyl ether,
polypropylene glycol monoethyl ether,
polypropylene glycol monoisopropyl ether,
polypropylene glycol monobuthyl ether,
polypropylene glycol monoocthyl ether,
polypropylene glycol monodecyl ether,
polypropylene glycol monohexadecyl ether,
polypropylene glycol monooctadecyl ether,

diethyleneglycol tripropyleneglycol
monomethyl ether,
tetraethyleneglycol dipropyleneglycol
monomethyl ether,
tetraethyleneglycol tripropyleneglycol
monomethyl ether,
tetraethyleneglycol tetrapropyleneglycol
monomethyl ether,
pentaethyleneglycol dipropyleneglycol
monomethyl ether,
pentaethyleneglycol tripropyleneglycol
monomethyl ether,
diethyleneglycol tetrapropyleneglycol
monomethyl ether,

hexaethyleneglycol dipropyleneglycol
monomethyl ether,
hexaethyleneglycol dipropyleneglycol
monomethyl ether,

hexaethyleneglycol tripropyleneglycol
monomethyl ether,
hexaethyleneglycol tetrapropyleneglycol
monomethyl ether,
hexaethyleneglycol pentapropyleneglycol
monomethyl ether,
hexaethyleneglycol hexapropyleneglycol
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heptaethyleneglycol dipropyleneglycol
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heptaethyleneglycol dipropyleneglycol
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heptaethyleneglycol tripropyleneglycol
monomethyl ether,
heptaethyleneglycol tetrapropyleneglycol
monomethyl ether,
heptaethyleneglycol pentapropyleneglycol
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monomethyl ether,
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col monomethyl ether,

octaethyleneglycol dipropyleneglycol
monomethyl ether,
octaethyleneglycol tripropyleneglycol
monomethyl ether,
octaethyleneglycol tetrapropyleneglycol
monomethyl ether,
octaethyleneglycol pentapropyleneglycol
monomethyl ether,
octaethyleneglycol hexapropyleneglycol
monomethyl ether,
octaethyleneglycol heptapropyleneglycol
monomethyl ether,

polyethyleneglycol polypropyleneglycol
monomethyl ether,

triethylene glycol, ✓
tetraethylene glycol, ✓
pentaethylene glycol, ✓
hexaethylene glycol, ✓
heptaethylene glycol, ✓
octaethylene glycol, ✓
decaethylene glycol, ✓
tridecaethylene glycol, ✓
hexadecaethylene glycol, ✓
eicosaethylene glycol, ✓
pentacosaeethylene glycol, ✓
triacosaethylene glycol, ✓

tripropylene glycol, ✓
tetrapropylene glycol, ✓
pentapropylene glycol, ✓
hexapropylene glycol, ✓
heptapropylene glycol, ✓
octapropylene glycol, ✓
decapropylene glycol, ✓
tridecapropylene glycol, ✓
hexadecapropylene glycol, ✓
eicosapropylene glycol, ✓
pentacosapropylene glycol, ✓
triacosapropylene glycol, ✓

triethylene glycol tripropylene glycol,
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tetraethylene glycol tetrapropylene
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glycol,
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glycol,
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glycol,
octaethylene glycol octapropylene glycol,
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tripropylene glycol triethylene glycol
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monomethyl ether,

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monomethyl ether,
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heptapropylene glycol pentaethylene
glycol monomethyl ether,
heptapropylene glycol hexaethylene
glycol monomethyl ether,
heptapropylene glycol heptaethylene
glycol monomethyl ether

octapropylene glycol diethylene glycol
monomethyl ether,

octapropylene glycol triethylene glycol
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octapropylene glycol pentaethylene
glycol monomethyl ether,
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octapropylene glycol heptaethylene
glycol monomethyl ether
octapropylene glycol octaethylene glycol
monomethyl ether
polypropylene glycol polyethylene glycol
monomethyl ether

tripropylene glycol triethylene glycol
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tetrapropylene glycol triethylene glycol
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tripropylene glycol triethylene glycol
monomethyl ether,
octapropylene glycol diethylene glycol
monomethyl ether,

octaethylene glycol dipropylene glycol
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octaethylene glycol tripropylene glycol
monomethyl ether,
octaethylene glycol tetrapropylene
glycol monomethyl ether,
octaethylene glycol pentapropylene
glycol monomethyl ether,
octaethylene glycol hexapropylene glycol
monomethyl ether,
octaethylene glycol heptapropylene
glycol monomethyl ether,

octaethylene glycol octapropylene glycol
monomethyl ether,
polyethylene glycol polypropylene glycol
monomethyl ether.

A solvent or diluent may be ~~incorpora-~~
~~ted~~ into the raw materials such as boric
acid, borate ^{ester} ~~ester~~ of lower ^{alcohol} ~~alcohol~~ and
polyoxyalkylene, or into borate esters
of glycol ether.

If ~~the~~ ^a solvent or diluent ^{is} ~~are~~ employed,
they must not disturb the ~~esterification~~ ^{esterification-dehydration}
~~dehydration~~ or ester-exchange reaction
and their boiling ^{point(s)} ~~point~~ ^{should} ~~are~~ preferable
^{be below} ~~below~~ the boiling point of the ~~by-pro-~~
~~ducts~~ or polyoxyalkylenes. ^{byproducts}

^{Examples} ~~Example~~ of ~~the~~ ^{solvents} ~~solvents~~ or ^{diluents} ~~diluent~~ are
ethers such as diethyl ether, dioxane,
tetrahydrofran; aliphatic hydrocarbons
such as hexane, acetic anhydride, ^{heptane} ~~hepta-~~
~~ne~~ octane, nonane, decane, undecane;
aromatic hydrocarbons such as benzene, ^{cycloalkanes} ~~cycloalkane~~ such as ^{cyclohexane} ~~cy-~~
~~clohexane~~, cyclohexene; non-proton polar
^{compounds} ~~compounds~~ such as dimethy formamide, ^{dimethyl} ~~di-~~
~~methyl~~ sulfoxide, hexamethyl polyamide
phosphate, acetonitrile, N-methyl ~~pyrro-~~ ^{pyrrolidone}
~~lidone~~; and their chlorine substituted
^{compounds} ~~compound~~ such as chloroform and carbon
tetrachloride.

^{catalyst} ~~A catalysts~~ for the ~~esterification-~~ ^{esterification-dehydration}
~~dehydration~~ or ester-exchange reaction
may be used. ^{catalyst} ~~is~~

If ~~the~~ ^a ~~catalysts~~ ^{catalyst} ~~are~~ necessary for ^{condensation} ~~conde-~~
~~nsation~~ catalysis are recommended.

~~Example~~ of ~~the~~ catalysts are metallic

^{Examples}

^{salts} ~~salt~~ of organic ^{acids} ~~acid~~ such as ferrous ^{octanoate} ~~ac-~~
~~tanoate~~, ferrous naphthenate, cobaltous
naphthenate, manganese octanoate, ~~stann~~ ^{stannum}
~~um~~ octanoate, stannum naphthenate, lead
octanoate, lead naphthenate, organotin
^{compounds} ~~compound~~ such as ^{dibutyl} ~~dibutyl~~ tin diacetate,
^{dibutyl} ~~dibutyl~~ tin dioctanoate, dibutyl tin
dilaurate, ^{dibutyl} ~~dibutyl~~ tin dioleate, dibutyl
tin dimethoxide, oxidized dibutyl tin;
metal ^{alcoholates} ~~alcoholate~~ such as tetrabutyl
titanate, tetrabutyl zirconate; titanium
^{chelates} ~~chelate~~ such as di-isopropoxy bis-acetyl
acetate titanium, 1, 3-propanedioxy
bis-ethylacetate titanium, 1, ^{3-propanedioxy} ~~3-propa-~~
~~nedioxy~~ bis-ethylacetoacetate titanium;
^{aluminum chelates} ~~aluminum chelate~~ such as ^{aluminum acetylacetonate} ~~aluminum acetyl-~~
~~acetate~~, ^{aluminum} ~~aluminum~~ tris-ethylacetoaceto-
~~nate~~; amines such as hexyl amine, dodec-
^{dodecylamine} ~~ylamine~~ phosphate, dimethyl hydroxyamine,
diethyl hydroxyamine; tetra-ammonium
^{salts} ~~salt~~ such as benzyl hydroxyamine; inorg-
^{acids} ~~anic acid~~ such as ^{hydrochloric} ~~hydrochloric~~ acid,
nitric acid, ^{sulfuric} ~~sulfuric~~ acid, phosphoric
acid; organic ^{acids} ~~acid~~ such as acetic ^{anhydride} ~~anhyd-~~
~~ride~~, pure acetic acid (over 99.8%), ^{propionic} ~~pro-~~
~~pionic~~ acid, citric acid, benzoic acid,
formic acid, acetic acid, oxalic acid,
p-toluenesulfonic acid; ^{chlorosilanes} ~~chlorosilane~~
such as methyl tri-chlorosilane, dimeth-
yl di-chlorosilane; inorganic ^{bases} ~~base~~ such
as aqueous ammonia; organic ^{bases} ~~base~~ such as
ethylene diamine, tri-ethanol amine; and
amino alkylamine.

It is preferable that the ^{esterification-dehydration} ~~esterification~~
~~ion-dehydration~~ or ester-exchange reac-
tion is carried out under ~~the~~ conditions

of at reduced or atmospheric pressure, ^{pressures and at a temperature of}
from 50 to 250°C, ^{and preferably} ~~temperature, favourably~~
from 100 to 180°C.

~~Under the reaction, removal of byprod-~~
~~ucts such as lower alcohol or water can~~
~~proceed the reaction easily because removal~~
~~of byproducts proceeds the reaction~~
~~equilibrium to favorable direction of~~
~~borate ester of polyoxyalkylenes format-~~
~~ion.~~ ^{formation}

As to the removal ^{methods} ~~method~~, azeotropic
distillation using ^{an} azeotropic agent and
batch or continuous distillation using
a distillation tower are preferable. ^{properties}

For the purpose of improving the ~~prop-~~
~~erties~~ of the borate ester of polyoxya-
^{polyoxyalkylenes} ~~kylenes~~, amino group containing ^{compounds} ~~compound~~
and/or ^{solved} ~~solvent~~ may be added to said ~~borate~~
~~te~~ esters of polyoxyalkylenes.

Adding the amino group containing ^{compounds} ~~com-~~
~~pound~~ to the borate ^{ester} ~~ester~~ of polyoxya-
~~kylenes~~ ^{suppresses} ~~exhibits~~ the suppressing of bor-
~~ate~~ ester hydrolysis and also ^{provides} ~~exhibits~~
a rust preventive effect under the ^{conditions} ~~condit-~~
^{the presence} ~~ion of existence~~ of water or its vapor.

Examples of the amino-group containing ^{compounds} ~~compound~~ include alkylamine, ^{cycloalkylamine} ~~cycloalkyl~~
amine, alkanol amine, heterocyclic amine,
diamine, lactam, cyclic imide and ^{polyamine} ~~poly-~~
amine, which may be used alone or ~~combi-~~ ^{combination}
~~nation, selecting from these compound~~

As the alkyl amine, there can be used
methyl amine, dimethyl amine, trimethyl
amine, ethyl amine, diethyl amine, tri-
ethyl amine, propyl amine, N, N-di[poly(4)
oxyethyl] hexadecyl amine, dodecyl dime-

thyl amine, stearamide propyl dimethyl amine, polyoxyethylene (3-30) octadecyl amine, polyoxyethylene (3-30) lauryl amine, polyoxyethylene (3-30) oleyl amine, ~~polyoxyethylene (3-30) dilauryl amine, polyoxyethylene (3-30) stearyl amine, polyoxyethylene (3-30) alkylamine, polyoxyethylene (3-30) dialkyl amine, and di (oleoxyloxyethyl) hydroxy amine.~~

As the cycloalkyl amine, there can be used cyclohexyl amine, methyl ~~cyclohexyl~~ ^{cyclohexylamine} amine and ethyl cyclohexyl amine.

As the alkanol amine, there can be use d ethanol amine, diethyl hydroxy ~~amine~~ ^{methylamine}, diethanol amine, dimethyl ~~amine~~ ^{methyl} ~~ethanol~~ ^{aminoethanol}, triethanol amine, propanolamine, dimethyl 2-hydroxypropyl amine, butanol amine, methyl di (2-hydroxyethyl) amine, tri (2-hydroxyethyl) amine, hydroxymethyl di (2-hydroxyethyl) amine, dibenzyl ~~2-hydroxypropyl~~ ^{2-hydroxypropyl} ~~2-hydroxyethyl~~ ^{2-hydroxyethyl} amine and cyclohexyl di (2-hydroxyethyl) amine.

As the cycloalkanol amine, there can be used cyclohexanol amine, methyl ~~cyclohexanol~~ ^{methylcyclohexanol} amine and ethylcyclohexanol amine.

As the heterocyclic amine, there can be used ~~used~~ pyridine, lutidine, 3, 4-xylidine, piperidine, N-methyl piperidine and N-ethyl piperidine.

As the lactam, there can be used propio lactam, N-methylpropio lactam, N-ethyl ~~buthyro~~ ^{buthyro} lactam, N-methyl varero lactam, N-methyl caprolactam and phenyl caprolactam.

As the cyclic imide, there can be used

succinimide, N-methyl succinimide, N-ethyl succinimide, phenyl succinimide and 2-undecyl imidazoline.

As the diamine, there can be used ethylene diamine, triethylene diamine and tetraethylene diamine.

As the polyamine, there can be used diethylene triamine, triethylene tetra-~~mine~~ and pentaethylene pentamine.

Among these ~~amino-group~~ ^{amino-group} containing ~~com-~~ ^{compounds} pound, tertiary ~~amino-group~~ ^{amino-group} containing ~~com-~~ ^{compounds} compounds exhibit excellent ~~effect~~ ^{effects} of preventing hydrolysis of borate ester of polyoxyalkylene and promoting the ~~clea-~~ ^{cleaning} ning and purging the coloured ~~contamina-~~ ^{contaminants} nts.

^{Examples} Example of tertiary ~~amino-group~~ ^{amino-group} containing ~~com-~~ ^{compounds} compounds having ^{the} above mentioned excellent properties are polyoxyethylene (3-30) octadecyl amine, polyoxyethylene (3-30) laurylamine, polyoxyethylene (3-30) oleyl amine, polyoxyethylene (3-30) di-lauryl amine, polyoxyethylene (3-30) stearyl amine, polyoxyethylene (3-30) alkylamine, polyoxyethylene (3-30) dialkyl amine and di(oleoyloxyethyl) hydroxy amine.

The amount of ~~amino-group~~ ^{amino-group} containing ~~com-~~ ^{compounds} compound to 100 parts by weight of ~~borate~~ ^{borate} ester of polyoxyalkylene is from 0 to 100 parts by weight, ~~favourably~~ ^{and preferably} from 5 to 50 parts by weight and most ~~favourably~~ ^{preferably} from 10 to 30 parts by weight.

Use of ^a ~~the~~ solvent contributes to lower viscosity of the borate ester of polyoxyalkylene.

As ^a ~~the~~ solvent, there can be used

water, methyl alcohol, ethyl alcohol, isopropyl alcohol, butyl alcohol, ^{isopropyl} ~~isopropyl~~ ether, ether, ethylene glycol, ^{polyethylene} ~~polyethylene~~ glycol, polyethylene dimethyl ester, diethylene glycol, triethylene glycol, ethylene glycol dimethyl ether, ^{diethylene} ~~diethylene~~ glycol dimethyl ether, ^{glycol} ~~glycol~~ diethyl ether, ethylene glycol dipropyl ether, triethylene glycol dimethyl ether, ^{monobutyl} ~~monobutyl~~ triethylene glycol monobutyl ether, ^{monobutyl} ~~monobutyl~~ diethylene glycol monobutyl ether, ^{monobutyl} ~~monobutyl~~ diethylene glycol diethyl ether, ^{dibutyl} ~~dibutyl~~ diethylene glycol propyl ether, ^{dimethyl} ~~dimethyl~~ diethylene glycol diethyl ether, dimethyl ether, propylene glycol, acetone, methyl ethyl ketone, furfural, dioxane, methane sulfonate, diethyl ether, tetrahydrofuran, hexane, acetic anhydride, ^{undecane} ~~undecane~~ heptane, octane, nonane, decane, ^{cyclohexane} ~~cyclohexane~~ benzene, toluene, xylene, ^{cyclohexane} ~~cyclohexane~~ cyclohexene, dimethyl formamide, dimethyl sulfoxide, hexamethyl triamide phosphate, acetonitrile, N-methyl ^{pyrrolidone} ~~pyrrolidone~~ pyrrolidone, chloroform and carbon ^{tetrachloride} ~~tetrachloride~~ tetrachloride and the solvents are used by alone or combination.

The amount of solvent to 100 parts by total weight of borate ester of ^{polyoxyalkylene} ~~polyoxy~~ alkylenes and ^{amino-group} ~~amino-group~~ containing compounds ^{are} ~~are~~ from 0 to 100 parts by weight, ^{and preferably} ~~favourably~~ from 5 to 50 parts by weight and most ^{preferably} ~~favourably~~ from 10 to 30 parts by weight.

^{Ingredients} ~~The other ingredient~~ other than ^{the} ~~amino-group~~ amino-group containing ^{compounds} ~~compound~~ and/or solvent may be incorporated ^{into} ~~to~~ borate ester of ^{solvents} ~~solvents~~

polyoxyalkylene for the purpose of ~~impr-~~^{improving}
~~oving~~ the properties of cleaning and
purging ^{the} resin compound ~~of~~ the present
invention.

As ~~the~~ ^{for} other ~~ingredient~~^{ingredients}, there can be
used stabilizer^s, neutralizer^s, ~~antioxidant~~^{antioxidants},
~~nt~~, ultraviolet absorber^s, light ~~stabilizer~~^{stabilizers},
~~zer~~, antistatic agent^s, lubricant^s, ~~processability~~^{processability},
~~ssability~~ improving agent^s, filler^s, ~~disp-~~^{dispersing},
~~ersing~~ agent^s, coupling agent^s, ~~anticopper~~^{anti-copper},
rusting agent^s, blowing agent^s, nuclear ~~deformers~~^{deformers},
forming agent^s, ~~anti-forming~~^{anti-forming} agent^s, ~~deform-~~^{deformers},
~~mer~~, ~~colorant~~^{colorants}, pigment^s, ~~dyeing~~^{dyeing} agent^s,
carbon black, water tree preventing
agent^s, voltage stabilizer^s, ~~antitracking~~^{anti-tracking},
agent, organic peroxide, crosslinking
agent^s, disinfectant^s, antiseptics, ~~anti-~~^{anti-mold}
~~mold~~ agents^s and ~~anti-rust~~^{anti-rust} agent^s.

In the present invention, the resin
composition for purging ~~contaminant~~ ^{contaminants}
means ~~the~~ ^a resin composition which is fed
from ^a hopper ^{into the} inside ~~vacancy~~ of ~~the~~ ^a
plastic processing machine to fill the
~~vacancy~~ ^{plastic processing machine} with the resin composition.

The ~~vacancy~~ of plastic processing ^{a production}
machine had ^{previously} been filled with ~~other~~ ^{resin} resin
composition for producing ~~the~~ plastic
~~mold~~ ^{molds} or film ^{during} and the ~~surface~~ ^{surface} of screw
barrel and die had ^{become} ~~been~~ stuck with the
~~coloured~~ ^{colored} sticky contaminant formed by
decomposition of the resin.

In case of long time ~~operation~~ ^{production} or ~~the~~ ^{production operations}
resin ~~composition~~ ^{compositions} are ~~changed~~ ^{changed} for producing
other ~~sort of~~ plastic article^s, ~~remained~~ ^{remained}
resin ~~composition~~ ^{compositions} used for ~~previous~~ ^{previous}
~~product~~ and the ~~contaminant~~ ^{contaminants} caused by

products

contaminants produced

long time operation must be purged ^{before} for
new plastic article production ^{holder} to ~~prevent~~ ^{prevent}
~~at cross-contamination.~~ ^{used}

The resin composition ^{used} for purging ~~con-~~ ^{contaminants}
~~taminant~~ and ~~remained~~ ^{residual} previously used
resin composition ^{composition(s)} is fed ^{into} plastic
processing machine after previous ~~plast-~~ ^{plastic}
~~ic~~ article production is over.

The resin composition ^{used} for purging may
be continuously fed ^{into the processing machine} or stopped after the
~~resin composition is filled the vacancy~~ ^{machine is filled.}
~~of the plastic processing machine.~~

After the resin composition ^{used} for purg-
~~ing is filled,~~ ^{the processing machine is filled with the} then switch off the heat
^{is switched off} source ^{purging} and ~~lower~~ the machine temperature is lowered
to room temperature and ~~leaves~~ the resin
composition ^{remains in the processing machine} as it is for sufficient time
such as from 6 to 48 hours to contact ^{previously}
with contaminants and residue of ~~previo-~~ ^{production}
~~usly used~~ resin composition ^{composition(s).}

When the next plastic mold or film ^{composition}
will be produced, the new ^{production} resin ~~composi-~~
tion for next plastic mold or film will
be fed into the plastic processing ~~mach-~~ ^{machine;}
~~ine,~~ ^{Then any} ~~then the~~ ^{remaining} ~~remained~~ ^{purge} resin comp- ~~composition~~
~~osition absorbed~~ ^{having} with contaminant will be
~~exhausted~~ ^{absorbed there in} ~~purged.~~

The resin used for the resin ~~composit-~~ ^{composition}
~~ion~~ of present invention is the ~~thermo-~~ ^{thermoplastic}
~~plastic~~ resin.

As the thermoplastic resin, there can
be used high density polyethylene, high
pressure low density polyethylene such
as HP-LDPE, EVA, EEA, Ionomer, olefin
vinylalcohol copolymer, LLDPE, VLDPE,
polypropylene (PP), ~~polystyrene~~ ^{polystyrene} (PS),

~~acrylonitrile-butadiene-styrene copolymer~~ ^{styrene copolymer}
~~mer (ABS), acrylonitrile-styrene copolymer~~ ^{styrene}
 (AS), acrylonitrile-butadiene copolymer,
 acrylonitrile acrylate-styrene copolymer,
 polyvinyl chloride (PVC), polyamide, ~~poly-~~
^{polymethyl methacrylate} ~~methylemethacrylate~~ (PMMA), polyacetal (POM),
 aminopolyacrylamide, polyarylate, fluoro
 carbon resin, polyimide (PI), ^{polyaminobismaleimide} ~~polyamino-~~
~~bismaleimide~~ (PABI), polyamideimide (PAI),
 polyetherimide (PEI), bismaleimidetriazine
 resin (BT), polysulfone, polybutylene
 terephthalate (PBT), polyethylene ^{terephthalate} ~~tereph-~~
~~thalate~~ (PET), polyvinylidene chloride,
 polycarbonate (PC), polyvinyl acetate,
 polyvinyl alcohol, polyvinyl ether,
 polyvinyl formale, modified PPE, ~~modifi-~~
~~ed~~ polyphenyleneoxide (PPO), polyphenylene
 sulfide (PPS), polyethersulfone (PESF),
 polyetheretherketone (PEEK), polyarysulfon
 e (PAS), ^{polymethylpentene} ~~polymethylpenten~~ (TPX), liquid
 crystal polymer, silicone resin, natural
 rubber (NR), butyl rubber (IIR), acrylonitr
 ile-butadiene rubber (NBR), chloroprene
 rubber (CR), styrene butadiene rubber (SBR),
 butadiene rubber (BR).

^{the} ~~Production~~ method of ^{the resin composition} ~~the resin compos-~~
~~ition~~ for purging away ^{contaminants} ~~contaminant~~ ^{according to}
 the present invention is not limited
 to ^{any} ~~a~~ specific method; however, ^{the} following
 method is desirable.

To the 100 parts by weight of a ~~thermo-~~ ^{thermoplastic}
~~plastic~~ resin, 0.1~10 parts by weight of
 a borate ester of glycol ether expressed
 by general formula (1) is added.

The ~~form of the~~ thermoplastic resin
 may be, powder or pellet form.

in the form
 of a

The borate ester of polyoxyalkylenes may be soaked into thermoplastic resin powder or pellet. pellets

~~The soaking~~ ^{It} is desirable to conduct ^{the soaking} at ^a the temperature of over the glass transition ^{transition} point because ^{so that} at the temperature soaking speed is fast.

~~The other~~ ^{Another} production method for ^{producing} purge resin composition ^{compositions} of the present invention ^{invention} may be conducted as follows.

The thermoplastic resin and borate ester of polyoxyalkylenes are fed ~~to~~ ^{into} a plastic processing machine or bunbury mixer, in which they are blended and extruded ~~from~~ ^{through a} pelletizing die having many ~~hole~~ ^{holes} of 3~7mm diameter.

Each extruded ~~strings~~ ^{string} are cut to form ~~pellet~~ ^{pellets} having ~~the~~ ^a length of 3~7mm.

~~In case~~ ^{It} the amount of the borate ester of polyoxyalkylenes is less than 0.1

parts by weight, the resin composition

for purging does not exhibit the ~~clean~~ ^{cleaning}

~~ing and purging effect, and in case more~~ ^{purging} ~~than 10 % parts by weight, it is not~~ ^{If on the other hand the amount of}

~~desirable because the~~ ^a uniform polymer blend is barely obtained. ^{the borate ester of polyoxyalkylenes}

EXAMPLE

Now, the resin ^{compositions} ~~composition~~ for purging away ~~contaminant~~ ^{contaminants} in the plastic processing machine according to the present invention will be described in further detail with reference to ~~Example~~ ^{specific Examples}

However, it ~~should~~ ^{should} be understood that

the present invention is by no means restricted by such specific ~~Example~~. *Examples*

Example 1

Borate ester of polyoxyalkylene ~~expressed~~ *expressed* by chemical formula (2) was ~~obtained~~ *obtained* by following synthesis process.

In a 7000 ml flask equipped with three inlet ~~pipe~~ *pipes* and displaced by nitrogen gas were charged 146g (1 mole) of triethyl borate $[B(OC_2H_5)_3]$, 1.2g of dibutyl tin dilaurate and 50 ml of benzene.

Subsequently, ~~to~~ the solution in the flask ~~was added with~~ *was added* 996g (3 mole) of tripropyleneglycol triethylenglycol monomethyl ether *under* stirring ~~condition~~ *conditions* to obtain uniform blended solution.

Subsequently, the solution in the flask was stirred for 13 hours at $95^\circ C$ under ~~the condition~~ *conditions* of distillation to remove ~~the~~ *and* ethanol and benzene as the byproduct *to* obtain 1002g (0.99 mole) of a borate ester of polyoxyalkylene ~~expressed~~ *expressed* by chemical formula (2).

a In a vessel, 99.0 parts by weight of high pressure low density polyethylene (made by Nippon Unicar Company Ltd., melt mass flow rate 1.2g/10 min., density 0.923 g/cm³) and 1.0 parts by weight of borate ester of polyoxyalkylene *expressed* by chemical formula (2) obtained by above *minutes* mentioned method were blended for 5 ~~min~~ *minutes* ~~utes~~ *at* room temperature to obtain *a* ~~mixture~~ *mixture*, ~~then~~ *then* the mixture was thrown ~~in~~ *into* to the continuous blending extruder (made *a*

by K. C. K. Company Ltd., machine name K. C. K 80X2-35 VEX type) to produce ~~the~~^a resin ~~composition~~^{contaminant} for purging away a ~~contaminant~~^{as} in a pellet form having ^a length of 3 mm and ^a diameter of 3mm.

The resin composition was named ~~thereafter~~^{thereafter} after purge resin composition (1).

Subsequently, the purging effect ~~valuation~~^{evaluation} test was conducted by following ~~procedures~~^{procedure}.

~~Dry-blend~~^{A dry-blend} was prepared by blending 95 kg of ~~non-coloured~~^{non colored} low density polyethylene ~~pellets~~^{polyethylene pellets} (made by Tosco Company Ltd., PETLOSENE 183) with 5kg of ~~colour~~^{color} master batch (made by Tokyo Ink Company Ltd., PEX 3152, blue ~~coloured~~^{colored}). Then the obtained dry-blend of 100kg ~~were~~^{was} thrown to ~~the~~^{the} hopper of ~~the~~^{an} extruder having ^a 65mm diameter screw. Then the dry-blend ~~were~~^{was} fed into ~~the~~ extruder to be heat-kneaded.

After 100kg of ~~the~~^{the} dry-blend were passed through the extruder, the purge resin ~~composition~~^{contaminants} (1) for purging away ~~contaminant~~ of the present invention obtained by above mentioned method ~~were~~^{was} fed to the same extruder and passed through ~~the~~^{the} ~~said~~^{until} ~~purge resin composition (1)~~^{the} till the residue of above mentioned ~~colour~~^{color} master batch which ~~were~~^{was} stuck or adhered to the ~~surface~~^{surface} of the screw and barrel ~~were~~^{was} purged.

This procedure is called as ~~decolourization~~^{decolorization}.

As the blank test, ^{the} decolourization test were conducted except that the resin composition for purging away ~~con~~^{contaminants}

taminant of the present invention was
exchanged ^{by} ~~for~~ the non-coloured linear low
density polyethylene ~~pellet~~ ^{pellets} (made by Toso
Company Ltd., FS240A). ^{purge} ^{composition}

Company Ltd., FS240A). ^{purge} Also, comparative ~~purge~~ ^{composition} resin ~~composition~~ ^{composition} ~~tion~~ I and comparative ~~purge~~ ^{purge} resin ~~comp~~ ^{composition} ~~osition~~ II were prepared for comparative ~~decolourization~~ ^{decolorization} ~~test~~ ^{tests}, which were ~~equiva-~~ ^{equivalent} ~~lent~~ to the conventional ~~purge~~ resin composition as described in ^{the} ~~above~~ " ~~Desc-~~ ¹ ~~ription~~ of the Related Art " ~~section~~ ^{section}.

Description:

Comparative pargé resin composition I

Resin composition consisting 99.0 weight % of high pressure low density polyethylene (made by Nippon Unicar Company Ltd., melt massflow rate 1.2g/10 min., density 0.923g/cm³) and 1.0 weight % of poly (9) oxyethylene nonylphenyl ether.

Comparative pargé resin composition II

Resin composition consisting 99.0 weight % of high pressure low density polyethylene (made by Nippon Unicar Company Ltd., melt massflow rate 1.2g/10 min., density 0.923g/cm³ and 1.0 weight % of poly (II) oxyethylene dodecylether sodium sulfate.

Result of decourrization of
purge resin composition (1)

Each purge resin resin composition ~~am-~~^{amount}
~~unt~~ used till decolourization were ~~obse-~~^{observed}

rved were as follows.

- Purge resin composition (1)
of the present invention 22kg
- Blank test 280kg
- Comparative purge resin
composition I 250kg
- Comparative purge resin
composition II 230kg

According to the above ^{results} ~~result~~, it ^{can be seen} ~~was~~ ^{composition (I)} ~~recognized~~ that the purge resin ~~composition (I)~~ was excellent compared to the comparative purge resin ~~composition~~, ^{compositions} because the ^{used} ~~used~~ amount of purge resin composition (1) ^{used} ~~was~~ about 10% of the ^{used} ~~used~~ amount of conventional type ^{purge} ~~purge~~ resin composition ^{used} ~~is~~ ^{resulting} ~~resulting~~ ⁱⁿ ~~to achieve~~ cost and time saving. ^{savings}

Example 2

Borate ester of polyoxyalkylenes ^{expressed} ~~expressed~~ by chemical formula (8) was ~~obtain-~~ ^{obtained} ~~ed~~ by following synthesis process.

In a 7000 ml flask equipped with three inlet ^{pipes} ~~pipe~~ and displaced by nitrogen gas were charged 146g (1 mole) of triethyl borate $[B(OC_2H_5)_3]$, 1.2g of dibutyl tin dilaurate and 50ml of benzene.

Subsequently, ^{to} the solution in the flask ^{was} ~~was added with~~ 756g (3 mole) of pentylethyleneglycol monomethyl ether ^{were added} under stirring ^{conditions} ~~condition~~ to obtain ^{a uniform} ~~uniform~~ ^(form) blended solution.

Subsequently, the solution in the flask was stirred for 13 hours at 95°C under ~~the condition of~~ distillation to

[↑]
conditions

remove ~~a~~ ethanol and benzene as the ^{by product} ~~product~~ ^{and} to obtain 758g (0.99 mole) of a borate ester of polyoxyalkylene ~~expressed~~ ^{expressed} ~~sed~~ by chemical formula (8).

In a vessel, 99.0 parts by weight of a high pressure low density polyethylene (made by Nippon Unicar Company Ltd., melt mass flow ^{rate} ~~late~~ 1.2g/10 min., density 0.923g/cm³) and 1.0 parts by weight of borate ester of glycol ether expressed by chemical formula (8) obtained by above mentioned method and 1.0 parts by weight of polyoxyethylene (9) lauryl amine were blended for 5 minutes ^{at} ~~under~~ room temperature ^{temperature} ~~ature~~ to obtain ^{a mixture} ~~a mixture~~. Then the ^{mixture} ~~mixture~~ ^{continuous-blending-extruder} ~~re~~ was thrown into the ~~continuous-blending-extruder~~ (made by K. C. K. Company Ltd., machine name K. C. K 80X2-35 VEX type) to produce ^a ~~the~~ resin composition for ^{purging} ~~purging~~ away ~~a~~ contaminant ^{as} ~~as~~ ⁱⁿ a pellet form having ^a ~~a~~ length of 3mm and ^a ~~a~~ diameter of 3mm.

The resin composition was named ~~there-~~ ^{hereafter} ~~after~~ purge resin composition (2). ^{evaluation}

Subsequently, the purging effect ~~valuation~~ ^{evaluation} test was conducted by following procedures. ^{A dry-blend}

~~Dry-blend~~ ^{A dry-blend} was prepared by blending 95 kg of ^a ~~non-coloured~~ ^{non-colored} low density ^{polyethylene} ~~polyethylene~~ ^{a pellets} ~~ene pellets~~ (made by Toso Company Ltd., PETLOSENE 183) with 5kg of ^{color} ~~colour~~ master batch (made by Tokyo Ink Company Ltd., PEX 3152, blue ^{colored} ~~coloured~~). Then the obtained dry-blend of 100kg ^{was} ~~were~~ thrown to ^{the} ~~a~~ hopper of ^{the} ~~an~~ extruder having ^a ~~a~~ 65mm diameter screw. Then the dry-blend ^{was} ~~were~~ fed into ^{the} ~~the~~ extruder to be heat-kneaded.

After 100kg of dry-blend were passed through the extruder, the purge resin composition (2) for purging away ^{contaminants} ~~contami-~~nant of the present invention obtained by above mentioned method ~~were~~ ^{was} fed ^{into} to the same extruder and passed through ~~the~~ ^{until} said purge resin composition (2) till the residue of above mentioned ~~colour~~ ^{color} master batch which ~~were~~ ^{was} stuck or adhered to the ~~surface~~ ^{surfaces} of the screw and barrel were purged.

Result of decolorization of purge resin composition (2)

Each purge resin amount used till ~~deco-~~ ^{decolorization} ~~lourization~~ ^{was} ~~were~~ observed were as follows.

- Purge resin composition (2) of the present invention 20kg
- Blank test 280kg
- Comparative purge resin composition I 250kg
- Comparative purge resin composition II 230kg

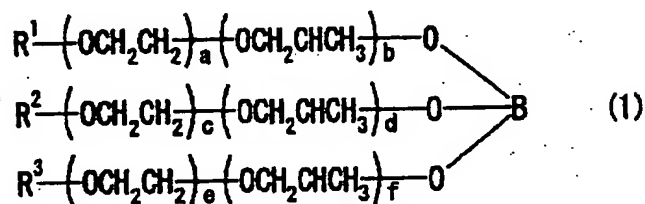
According to the above result, it ~~was~~ ^{can be seen} ~~recognized~~ that ^{the} purge resin composition (2) of present invention was excellent compared to the other purge resin, ^{results} ~~because~~ ^{because} use the ~~used~~ ^{composition} amount of purge resin ~~comp-~~ ^{used} ~~osition~~ of the present invention was about 10% of the ~~used~~ ^{purge} amount of ~~convent-~~ ^{composition} ~~ional~~ ^{used} purge resin ~~composition~~ ^{composition} resulting ~~to achieve~~ ^{conventional} cost and time saving ^{things}

WHAT IS CLAIMED IS

1. A resin composition for purging away contaminant in the plastic processing machine comprizing

(A) 100 parts by weight of a thermoplastic resin

(B) 0.1-10 parts by weight of a borate ester of polyoxyalkylene expressed by the following general formula (1)



wherein R^1 , R^2 and R^3 are independently selected from group consisting of hydrogen and hydrocarbon group, a, b, c, d, e and f are positive integers independently from 0 to 30 whose sum is from 6 to 80.

2. A resin composition for purging away contaminant in the plastic processing machine according to claim 1, which further comprizing

(C) 0.1-10 parts by weight of a aminogroup containing compound.

3. A purging method of a contaminant in the plastic processing machine by passing the resin composition of claim 1 or 2 through inside of said plastic processing machine.

ABSTRACT

Disclosed is a resin composition for purging away contaminant in the plastic processing machine and a purging method of a contaminant in the plastic processing machine using the resin composition.

The resin composition comprizes a thermoplastic resin and borate ester of polyoxyalkylene.